

ACCESSION NR: AP4047867

ENCLOSURE: 01

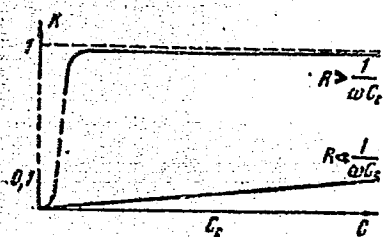


Fig. 1. Relationship between the transmission coefficient and capacitance depending on the resistance and frequency.

Card 3/3

BRANDT, A.A.; SHEVCHENKO, V.Ya.

Repolarization of triglycine sulfate crystals in linear  
periodic fields at frequencies of  $10^2 - 10^5$  cps.  
Kristallografiia 9 no.2:292-293 Mr-Apr'64. (MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

WASIUTYNSKI, Z.; BRANDT, A.

Measurements of six components of the strain tensor in a compressed concrete cylinder. Bul Ac Pol tech 12 no.12:911-914 '64.

1. Laboratory of the Theory of Structures of the Department of Continuous Media of the Institute of Basic Technical Problems of the Polish Academy of Sciences, Warsaw. Submitted October 10, 1964.

L 32027-65

ACCESSION NR: AP5005152

S/0188/65/002/001/0082/0084

AUTHOR: Brandt, A. A.; Kaminskiy, V. N.; Tyagunov, A. V.

TITLE: Investigation of a plasma frequency multiplier

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya  
1965, 32-84

TOPIC TAGS: frequency multiplication, nonlinearity, gas discharge plasma, neon.  
hydrogen, plasma frequency multiplier

ABSTRACT: The authors have investigated experimentally the efficiency of a microwave multiplier at frequencies low enough for the plasma to be much shorter than, or at least comparable with, the period of the field oscillations. The multiplier circuit is shown in Fig. 1. The nonlinear element was the plasma in a MN-6 neon lamp. The  $E_0$  were tuned to frequencies  $\omega_0$  and  $n$  = number of harmonics. The dependence of the results on the bias voltage  $E_b$ , optimal bias was used in all tests. The results show a marked decrease in the multiplication efficiency (de-

Card 1/3

L 32027-55

ACCESSION NR: AP5005152

0

defined as the ratio of the harmonic to fundamental power output) with increasing harmonic. This decrease, which can also be derived theoretically, is shown to be due to the gradual linearization of the voltage-current characteristic of the neon lamp with increasing frequency. It is noted in the conclusion that ionization is hindered in neon, and that the use of another gas, argon, for example, would increase the threshold of efficient frequency conversion by a factor of several times. Orig. art. has: 7 figures and 3 formulas.

ASSOCIATION: Kafedra fiziki kolebaniy (Department of Oscillation Inve...)

SUBMITTED: 01Apr64

ENCL: 01

SUB CODE: EC. ME

NO REF SOV: 000

OTHER: 010

ATD PRESS: 3199

Card 2/3

ALEKSANDROV, B.A.; BRANDT, A.A.; TYAGUNOV, A.V.

Decimeter frequency multiplier in a gas discharge within a  
nonuniform electric field. Vest. Mosk.un. Ser. 3: Fiz.,  
astron. 20 no.4:91 J1-Ag '65.

(MIRA 18:12)

1. Kafedra fiziki kolebaniy Moskovskogo gosudarstvennogo  
universiteta. Submitted February 1, 1965.

1 59521-65 EWT(1)/EIF(n)-2/ENG(m)/EPA(w)-2/EWA(h) Pz-6/Pc-1/Peb/Pi-4 LJP(c)  
 WW/AT UR/0188/65/000/003/0091/0093  
 621.374.4:533.99

ACCESSION NR: AP5016632

AUTHOR: Brandt, A. A. (Member of vibration physics dept); Tyaguncov, A. V. (Member of vibration physics dept)

TITLE: Frequency multiplier<sup>25</sup> using plasma in an inhomogeneous microwave field

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya, no. 3, 1965, 91-93

TOPIC TAGS: frequency multiplier, microwave frequency multiplier, plasma multiplier, nonlinear plasma

ABSTRACT: The authors first explain the principle of a plasma frequency multiplier operating on the specific effect produced by the current induced when a charge moves in a system of electrodes that produce an inhomogeneous electric field of high frequency. They then describe the plasma multiplier constructed for the investigation and illustrated in Fig. 1 of the Enclosure. Conversion efficiencies of 14 and 16 db were obtained for the third and fourth harmonics, respectively. The efficiency was found to be sensitive to shape (sharpness) of the harmonic-producing post (which couples the two waveguides). Orig. art. has: 1 figure, 5 formulas, and 1 table. [02]

Cord 13

L 59521-65

ACCESSION NR: AP5016632

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: 21Sep64

ENCL: 01

SUB CODE: EC, ME

NO REF SOV: 000

OTHER: 006

ATD PRESS: 4053

Card 2/3



L 59521-63

ACCESSION NR: AP5016632

To vacuum  
system

ENCLOSURE: 01

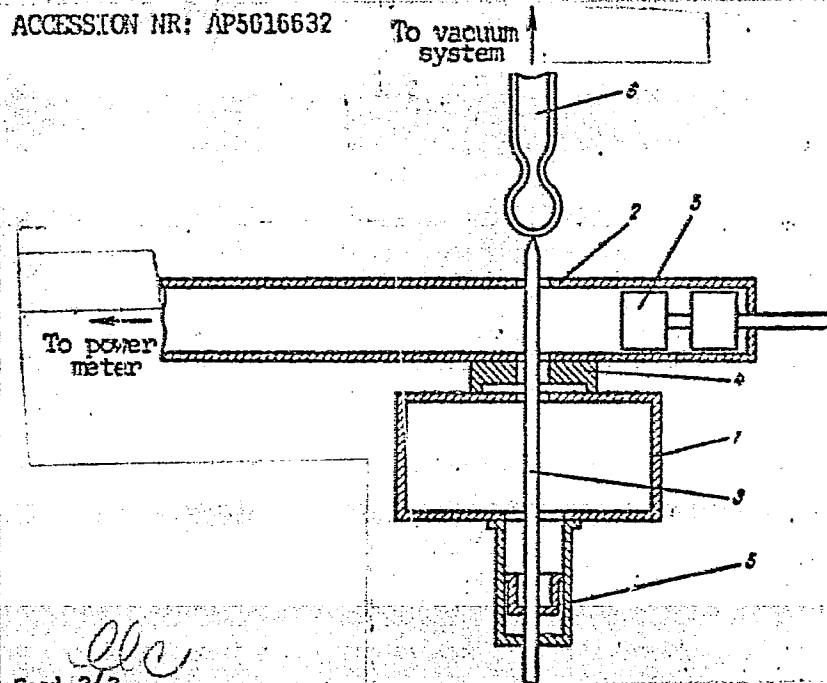


Fig. 1. Diagram of multiplier

- 1 - Main waveguide;
- 2 - harmonics waveguide; 3 - post;
- 4 - choke flange;
- 5 - tuning plunger;
- 6 - discharge chamber.

Card 3/3

BRANDT, A.A.; TYAGUNOV, A.V.

Frequency multiplier for operation in the 3-cm. band using gas-discharge plasma in a nonuniform electrical field. Radiotekh. i elektron. 11 no.1:154-156 Ja '66. (MIRA 19:1)

1. Submitted March 27, 1965.

BRANDT, A.A.; TYAGUNOV, A.V.

Theory of a frequency multiplier in a gas discharge within  
a highly nonuniform superhigh-frequency field. Vest. Mosk.un.  
Ser. 3: Fiz., astron. 20 no.4:92-93 J1-Ag '65.

(MIRA 18:12)

1. Kafedra fiziki kolebaniy Moskovskogo gosudarstvennogo  
universiteta. Submitted February 1, 1965.

COUNTRY : USSR I  
 CATEGORY : PLANT PHYSIOLOGY. Photosynthesis.  
 ABS. JOUR. : REF ZHUR - BIOLOGIYA, NO. 4, 1959, No. 15251  
 AUTHOR : Brandt, A.B.; Derevyanko, V.G.; Pavlova, I.P.\*  
 INST. : Not given  
 TITLE : Significance of Different Intensity and Spectral Composition of Light for Pigment Formation by Plants.  
 ORIG. PUB. : Biofizika, 1957, 2, No.6, 649-660  
 ABSTRACT : The property of pigment accretion (chlorophyll and carotenoids) in relation to the intensity and spectral composition of light was studied in leaves of grains, cucumbers, horsebeans, radishes, and lettuce. With low intensity exposure the pigment accumulated more rapidly in the red zone of the spectrum, and with high intensity in the blue zone. Young leaves contained more pigment and in a more labile form than old ones. The reaction  
 \* Tagayeva, S.V.  
 CARD: 1/2

BRANDT, A.B.

Carotenoid synthesis and accumulation in plants exposed to light of different spectral composition and intensity [with summary in English]. Biofizika 3 no.6:698-702 '58. (MIRA 12:1)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

(PIGMENTS,

carotenoids, eff. of light of various spectral composition & intensity on synthesis & concentration (Rus))

(LIGHT, eff.

on carotenoids, various spectral composition & intensity (Rus))

TAGEYEVA, S.V.; BRANDT, A.B.

Universal apparatus for determining optical properties of plants.  
Biofizika 4 no.2:232-237 '59. (MIRA 12:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.  
(PLANTS,

universal device for determ. of optic properties (Rus))

BRANDT, A. B., DEREVYANKO, V. G., TAGAEYEVA, S. V.

Inst. of Biophysics, Academy of  
Sciences, Moscow.

"The peculiarities of the leaves' optical properties."

paper submitted for the Third Intl. Congress on Photobiology, Copenhagen, 31 July -  
5 August 1960.

BRANDT, A. B., TAGEEVA, S. V.

Inst. of Biophysics, Academy of Sci., Moscow.

"Optical properties of leaves depending on the angle of light incidence."

paper submitted for the Third Intl. Congress on Photobiology, Copenhagen, 31 July -  
5 August 1960.



TAGEYEVA, S.V.; BRANDT, A.B.

Studying optical properties of leaves as related to the angle of incidence of light. Biofizika 5 no.3:308-317 '60. (MIRA 13:7)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.  
(LEAVES—OPTICAL PROPERTIES)

BRANDT, A.B.

Automatic device for switching on and off electric apparatus.  
Biofizika 5 no. 4:496-497 '60. (MIRA 13:12)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.  
(RADIOBIOLOGICAL RESEARCH--EQUIPMENT AND SUPPLIES)  
(ELECTRIC SWITCHGEAR)

TAGEYEVA, S.V.; BRANDT, A.B.; DEREVYANKO, V.G.

Variations in the optical properties of leaves during vegetation.  
Dokl. AN SSSR 135 no.5:1270-1273 D '60. (MIRA 13:12)

1. Institut biologicheskoy fiziki AN SSSR. Predstavleno akademikom  
A.I. Oparinym.

(Leaves—Optical properties)  
(Linden)

(Birch)

TAGEYEVA, S.V.; BRANDT, A.B.; KORSHUNOVA, V.S.

Optical properties of Chlorella pyrenoidosa suspensions.  
Biofizika 6 no.5:572-581 '61.

(MIRA 15:3)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

(ALGAE)

(SPECTRUM ANALYSIS)

TAGEYEVA, S.V.; BRANDT, A.B.; KORSHUNOVA, V.S.

Optical properties of plants under varying irradiation.  
Biofizika, 7 no.2:240-243'62. (MIRA 16:8)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.  
(PLANTS, EFFECT OF RADIATION ON)

TAGEYEVA, S.V.; PAVLOVA, I.P.; BRANDT, A.B.

Morphogenesis of the ultrastructure of chloroplasts and the development of optic properties of the corn leaf. Izv. AN SSSR. Ser. biol. 27 no.1:13-28 Ja-F '62. (MIRA 15:3)

1. Institut biologicheskoy fiziki AN SSSR.  
(CORN (MAIZE)—OPTICAL PROPERTIES)

TAGEYEVA, S.V.; BRANDT, A.B.

Determination of the spectral coefficients of optic parameters  
in plants. Biofizika 8 no.2:212-217 '63. (MIRA 17:10)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

L 12614-63

ACCESSION NR: AP3001542

EWT(1)/BDS/ES(a)/ES(b)/ES(c)/ES(k) AFFTC Pb-4 A/DD

S/0216/63/000/003/0391/0404

AUTHOR: Tageyeva, S. V.; Brandt, A. B.; Korshunova, V. S.; Generozova, I. P.

TITLE: Optic system characteristics of a Chlorella suspension and its photosynthetic activity

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 3, 1963, 391-404

TOPIC TAGS: chlorella, suspension, optic system, photosynthesis, autotrophic component

ABSTRACT: Chlorella suspensions are of interest as a possible food source and as an autotrophic component in space ships for prolonged flights. Data on the optic characteristics of such suspensions can be useful for more intensive growth of Chlorella cells. Several Chlorella suspension strains of different density were investigated on a general purpose apparatus for studying optic characteristics. Light absorption by the same type of Chlorella suspension conforms to the Buger-Lambert-Beer law and the absorption value is determined mainly by pigment (chlorophyll) concentration. But the absolute

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L 12614-63

ACCESSION NR: AP3001542

absorption value for different Chlorella types depends on cell size and microscopic structure. Small cells of a Chlorella suspension with a chloroplast of a more regular spheroid shape have a greater light diffraction capacity than large cells with a cuplike chloroplast. The light diffraction coefficient of low concentration Chlorella suspensions is proportional to the number of cells in the volume tested. Optic properties of Chlorella suspensions change according to the regularities established in physics. The light absorption coefficient of a Chlorella suspension increases slightly during bubbling at 90 l per hr due to light diffusion at the interphase boundary of water and air but there is no change in the optic properties of the Chlorella cells. Data on optic parameters of Chlorella suspensions can provide insights into the nature of photosynthesis and help produce unicellular cultures of higher productivity. This type of study should be developed together with methods of studying ultrathin structures, biophysical indices, and the respective functional states of individual cells and of suspensions as a whole. Orig. art. has: 10 figures.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biological Physics, AN SSSR)

Card 2/32

TAGEYEVA, S. V.; GENEROZOVA, I. P.; BRANDT, A. B.; KORSHUNOVA, V. S.

"Relations between the ultra-fine structure of the plant plastid apparatus and its functions."

report submitted for 10th Intl Botanical Cong, Edinburgh, 3-12 Aug 64.

Inst of Biological Physics, AS USSR, Moscow.

ACCESSION NR: AT4037704

S/2865/64/003/000/0335/0354

AUTHOR: Tageyeva, S. V.; Brandt, A. B.; Korshunova, V. S.; Generozova, I.P.

TITLE: Characteristics of algae suspensions as optical systems

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy\* kosmicheskoy biologii, v. 3, 1964, 335-354

TOPIC TAGS: light absorption, photosynthesis, closed ecological system, algae, Chlorella, life support

ABSTRACT: The optical properties of suspensions of Chlorella pyrenoidosa P-82 and Chlorella sp. K strains have been studied with the aid of a universal device for investigation of optical properties of plant leaves. Light absorption by Chlorella suspensions is largely determined by concentration of pigments (chlorophyll). Nevertheless, the absolute value for various strains of Chlorella strongly depends on cell dimensions and their microscopic structures. Many cells of the Chlorella sp. K suspension possessing chloroplasts of a more regular spherical shape have a greater light scattering capacity than the larger Chlorella pyrenoidosa P-82 cells which have a cup-shaped chloroplast. The value of the scattering

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ACCESSION NR: AT4037704

coefficient of both types of *Chlorella* suspensions at low densities is proportional to the density of suspensions. Transmission of a directed light beam by the suspension does not depend on the wavelength of the light, but can be explained by the "sieve effect." In the study of synchronous cultures of *Chlorella pyrenoidosa* P-82, considerable changes were found in its optical properties during development of cells. The greatest light absorption was found in the period of active growth and chlorophyll accumulation, i. e., 4 to 9 hr after the onset of the autospore growth. After cell division the amount of chlorophyll and the intensity of photosynthesis in the new autospores decrease considerably. At the same time the coefficient of absorption and the photosynthesis of the whole suspension continues to increase owing to the increase of suspension density at the expense of divided cells. An insignificant increase in the coefficient of light absorption of the *Chlorella* suspension when air is bubbled through the suspension (90 l/hr) is due to the scattering of light at the interface between water and air and not to a change in the optical properties of the cells. Knowledge of the optical parameters of strains of algae can provide valuable information on the nature of their photosynthetic mechanism and can also be used for purposes of calculation in designing equipment for obtaining high-productivity cultures of unicellular algae. On the basis of the data obtained, it is possible to draw the conclusion that if various

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ACCESSION NR: AT4037704

strains of Chlorella are to be used as one of the basic autotrophic components in the spacecraft system of the future, the particular natures of their optical systems should be studied in detail so that they can be taken into consideration in designing life support equipment.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: PH, LS

NO REF SOV: 015

OTHER: 014

Card

1 3/3

L 58936-65 EPA(s)-2/EMT(m)/EPF(n)-2/EMG(m)/T Pz-6/Pt-7/Pu-4 DS  
ACCESSION NR: AP5015652 UR/0217/65/010/003/0514/0517  
577.37

AUTHOR: Brandt, A. B.

TITLE: The effect of bubbling on a change in the optical qualities of Chlorella suspensions

SOURCE: Biofizika, v. 10, no. 3, 1965, 514-517

TOPIC TAGS: Chlorella, alga, algal suspension, bubble suspension, spectral coefficient, absorption coefficient

ABSTRACT: The effects of bubbling (42, 90, and 120 l/min) on the optical parameters of Chlorella suspension of various densities were studied, using an integrating sphere for examining the optical qualities of leaves and algal suspensions. Plastic containers with parallel walls (50 x 115 mm, depth 24 mm) held the suspensions, which were placed in the center of the sphere. An optical analysis of the characteristics of Chlorella suspensions during inert and active (bubbling) periods revealed that the spectral coefficient of absorption during bubbling increases as a function of increased bubbling intensity. The difference in absorption coefficient values increases as the density of the suspension decreases. In all cases, bubbling

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58936-65  
ACCESSION NR: AP5015652

caused a significant increase in the absorption coefficient value in the near-IR spectrum. An increase in the spectral coefficient of light absorption during bubbling does not occur as a result of increased light absorption by individual Chlorella cells but rather as a result of increased light absorption by the nutrient medium due to supplementary, multiple reflections by the surfaces of two components: gas forming (air bubbles) and liquid (aqueous nutrient medium), which might cause additional heating of the nutrient medium, thus increasing its evaporation. The directional passage of light disappears in bubbling suspensions. To decrease the amount of light to be absorbed in the nutrient medium and the possibility of overheating the suspension leading to increased evaporation when cultivating Chlorella, it is probably necessary to avoid excessive bubbling. Orig. art. has: 3 figures. [CD]

ASSOCIATION: Institut biologicheskoy fiziki, AN SSSR, Moscow (Institute of Biological Physics, AN SSSR)

SUBMITTED: 06Dec62

ENCL: 00

SUB CODE: LS

NO REF SOV: 003

OTHER: 000

ATD PRESS: 4048

Card 2/2

BRANDT, E. E.

232T100

USSR/Physics - Superconductivity  
May/Jun 52

"Superconductivity of Binary Alloys of Bismuth,"  
N. Ye. Alekseyevskiy, B. B. Brandt, T. I. Kos-  
tina

"Iz Ak Nauk SSSR, Ser Fiz" Vol 16, No 3,  
pp 233-263

A report given at the 26 Oct 51 session of the Dept. of Phys-Math Sci, Acad Sci USSR. Work was awarded the prize imeni N. D. Papaleksi by Presidium, Acad Sci USSR, as the best work in

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the field of physics in 1951. Authors report the discovery of supercond in 10 binary alloys of 2 nonsuperconducting metals, one of which is Bi<sub>1-x</sub>Sn<sub>x</sub> (Bi<sub>1</sub>, Bi<sub>0.9</sub>Sn<sub>0.1</sub>, Bi<sub>0.8</sub>Sn<sub>0.2</sub>, Bi<sub>0.7</sub>Sn<sub>0.3</sub>, Bi<sub>0.6</sub>Sn<sub>0.4</sub>, Bi<sub>0.5</sub>Sn<sub>0.5</sub>, Bi<sub>0.4</sub>Sn<sub>0.6</sub>, Bi<sub>0.3</sub>Sn<sub>0.7</sub>, Bi<sub>0.2</sub>Sn<sub>0.8</sub>, Bi<sub>0.1</sub>Sn<sub>0.9</sub>). Acknowledge lab aid of Ilyayev, Varslavskiy, Ikshevykh, Zertsalov, Litmanov, and Kholodov.

232T100



BRANDT, B. B.

7  
 Volumetric analysis of nitrocyclohexane. V. S. Shaflov.  
 B. B. Brandt, and G. N. Shcherbova. *Khim. Nauki i  
 Prom.* 2, 806 (1957).—The potentiometric titration curve of  
 KOH solns. contg. nitrocyclohexane (I) titrated with HCl  
 drops from a pH of 10.5 to 7.5 and gives a wide range in the  
 choice of indicators. Titration of 1–5 ml. of a 1–2% soln.  
 of I in EtOH contg. an excess of 0.1N KOH with HCl gave  
 quant. results with phenol. or thymolphthalein. In the  
 presence of adipic, glutaric, and succinic acids the results  
 were high (100.8%). This interference was overcome by  
 titrating back with the same indicators. I. Benicovitz

1/Distr: 4E4j/4E2c(j)/4B3d

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S/064/60/000/005/007/009  
B015/B058

11.7100

AUTHORS:

Brandt, B. B., Matov, L. A., Rozlovskiy, A. I.,  
Khaylov, V. S.

TITLE:

Explosion Danger in Mixtures of Nitrogen Oxides<sup>11</sup> With  
Combustible Gases and Vapors. Mixtures With Nitrous  
Oxide at Atmospheric Pressure 27

PERIODICAL: Khimicheskaya promyshlennost', 1960, No. 5, pp. 67 - 73

TEXT: The processing of gaseous products developing from nitration<sup>11</sup> and oxidation of various hydrocarbons by means of nitric acid (Table 1) is discussed and it is stated that explosive gas mixtures can develop in this case. It is pointed out that methods applied at present for evaluating the combustibility of gas mixtures containing several components are inadequate, and a method of classifying the combustion properties<sup>11</sup> of gas mixtures with more than 3 components is proposed, in which the dependence of the critical value of the coefficient  $\alpha$  of the oxidizing-agent excess on the total content of the inert components is determined, and an "upper" limit of gas ignition is defined. Data supplied by

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83505

Explosion Danger in Mixtures of Nitrogen  
Oxides With Combustible Gases and Vapors. S/064/60/000/005/007/009  
Mixtures With Nitrous Oxide at Atmospheric Pressure. B015/B058

publications on the ignition limit of binary mixtures of some fuels with nitrogen oxide and nitrous oxide are given in Table 2. In the present case, the ignition limit of three-component mixtures from  $N_2O$ , N and butane, cyclohexane, p-xylene and carbon monoxide with different nitrogen content and 1 atm pressure was determined in a special apparatus (Fig. 2). The critical values  $\alpha$  for the binary mixtures averaged 28 and  $\approx 0.3$ ; in the "upper" limit of the gas ignition  $\alpha \approx 1$  with  $N_2 = 75-78\%$ . The publication data for butane-CO mixtures (Refs. 15,17) are too low. It is shown that the true combustibilities of the mixtures investigated, which may be determined under consideration of the difference of the stoichiometric coefficients, practically coincide. The ignition limit of the cyclohexane- $N_2O$  mixtures are not influenced by smaller additions of CO. The CO additions can be neglected when determining the explosion danger of gaseous oxidation- and nitration products. G. N. Grozhan participated in some experiments. There are 10 figures, 2 tables, and 23 references: 7 Soviet, 8 US, 1 British, 3 German, 1 Italian, and 3 Dutch.

Card 2/2

BRANDT, B.B. ; MATOV, L.A. ; ROZLOVSKIY, A.I. ; KHAYLOV, V.S.

Explosion hazard of mixtures of nitrogen oxides with fuel gases  
and vapors. Khim.prom. no.5:419-425 J1-Ag '60.

(MIRA 13:9)

(Nitrogen oxide) (Gases) (Explosions)

S/020/60/132/05/43/069  
B004/B011

11.1000

AUTHORS: Brandt, B. B., Rozlovskiy, A. I.

TITLE: Explosive Decomposition<sup>1</sup> of Nitrous Oxide

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5,  
pp. 1129-1131

TEXT: Proceeding from papers by D. A. Frank-Kamenetskiy (Ref. 1) and Ya. B. Zel'dovich and V. I. Yakovlev (Ref. 2), the authors discuss the propagation of a flame in cold  $N_2O$  as dependent on the critical velocity  $u_{crit}$  of the flame and on the critical pressure  $p_{crit}$ .  $p_{crit} = 1.2$  atm abs was found from the equation for the velocity  $u_{fl}$  of the flame. The experimental determination of the critical conditions for inflammation took place in a cylindrical bomb. Ignition was brought about by burning out a copper wire by transformer short circuit. Experiments revealed that cold  $N_2O$  is actually inflammable. In the case of a bomb standing vertically and ignition at the lower end, the well reproducible value of

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## Explosive Decomposition of Nitrous Oxide

S/020/60/132/05/43/069  
B004/B011

$1.60 \pm 0.08$  atm abs was measured for  $p_{crit}$ . A nitrogen addition increases the value of  $p_{crit}$ . On an ignition from the top,  $p_{crit}$  rose to 10 atm abs. The reason why the calculated value of  $p_{crit}$  is too low could not be clarified. The authors point out that  $N_2O$  is prepared for medical purposes, and is liquefied without any precautionary measure although there is always the possibility of an inflammation by discharges of static electricity, heating, etc. Combustion processes in X18H9T (Kh18N9T) steel tubes allowed the conclusion of the maximum explosion pressure being in the range of 1000-4000 atm. The  $NO_2$  yield was determined potentiometrically and spectroscopically (Fig. 1). It depends on the initial pressure, amounts to 2.7% at 1.6 atm abs, and drops adiabatically with rising pressure. There are 1 figure and 13 references: 7 Soviet and 6 British.

ASSOCIATION: Institut azotnoy promyshlennosti i produktov organicheskogo sinteza (Institute of the Nitrogen Industry and Products of Organic Synthesis)

Card 2/3

Explosive Decomposition of Nitrous Oxide

S/020/60/132/05/43/069  
B004/B011

PRESENTED: February 18, 1960, by Ya. B. Zel'dovich, Academician

SUBMITTED: February 1, 1960

Card 3/3

20512

S/064/61/000/003/007/009  
B101/B203

11.1180

AUTHORS: Brandt, B. B., Rozlovskiy, A. I., Khaylov, V. S.

TITLE: Explosion hazard of mixtures of nitric oxides with combustible gases or vapors. Mixtures of nitric oxide and nitrogen peroxide at atmospheric pressure

PERIODICAL: Khimicheskaya promyshlennost', no. 3, 1961, 56-62

TEXT: To eliminate the explosion hazard in the nitration and oxidation of hydrocarbons by means of nitric acid, the authors studied the flash points of mixtures of hydrocarbons and nitric oxides. An earlier paper (Ref. 1: B. B. Brandt et al. Khim.prom.No.5,412 (1960)) had already reported on the flash points of mixtures with  $N_2O$ . In the present investigation, the authors studied mixtures containing  $NO$ ,  $NO+N_2O$ , or  $NO_2$  by the same method. To characterize the inflammation properties they determined, as indicated in Ref. 1, the coefficient  $\alpha$  of the excess oxidizing agent and the percentage  $[N_2]$  of the inert component. All inert components were

X

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20512

S/064/61/000/003/007/009

B101/B203

Explosion hazard of mixtures ...

regarded as nitrogen. 1) The experimental data for mixtures of n-butane, cyclohexane, p-xylene, and benzene with NO are shown in Fig. 5. This figure also contains data obtained by other researchers (o): 1) Methane, 2) n-butane, 3) CO. The narrower inflammation ranges found by other researchers are explained by too weak intensity of ignition. Fig. 6 shows that the inflammation range of NO is narrower than that of N<sub>2</sub>O, but that there is no basic difference between the two oxides. 2) When determining the flash points of cyclohexane in a mixture with NO + N<sub>2</sub>O, the molar fraction  $\beta$  of NO was kept constant, and the critical value of  $\alpha$  determined at different  $[N_2]$ . Fig. 9 compiles the results. Fig. 10 shows the extinguishing value  $[N_2]_{crit}$  as a function of  $\beta$ . It is concluded that a summational determination of nitric oxides is sufficient for judging the explosion hazard. Since N<sub>2</sub>O + NO are not inflamed as easily as mixtures containing only one of these components, a certain margin of safety is available. 3) When studying the inflammability of mixtures with NO<sub>2</sub>, reference is made to papers by E. B. Hodge (Ref. 7: Ind.Eng.Chem.,

Card 2/6

20512

Explosion hazard of mixtures ...

S/064/61/000/003/007/009  
B101/B203

30,1393, (1938)) and N. M. Emanuel' (Ref. 8: Izv.AN SSSR, OKhN, No.7,764 (1956)). To facilitate the interpretation of data, full dissociation of  $N_2O_4$  was assumed. The authors studied the inflammability of the mixtures  $NO_2 + C_6H_{12} + N_2$  and  $NO_2 + CO + N_2$ . The dosing of components was made by measuring their partial pressure by means of a mercury manometer. The Hg surface was protected by Vaseline oil. The CO stored above water was dried by bubbling with 65%  $H_2SO_4$ . The mixtures still contained about 0.1% of water vapor. Electric ignition of the mixtures with  $NO_2$  did not lead to high pressure rise. The limits of inflammability were indistinct. This peculiarity is explained by a formation of  $N_2O_5$  and  $O_3$  under the action of electric current. Data are compiled in Fig. 13. The fact that  $\alpha_{crit}$  for  $C_6H_{12} + NO_2$  is smaller than for the mixture  $C_6H_{12} + NO$  cannot be explained by endothermic dissociation of  $N_2O_4$ , since the latter changes the heat effect by 10% only. Gradual deoxidation of  $NO_2$  is assumed.

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20512

Explosion hazard of mixtures ...

S/064/61/000/003/007/009  
B101/B203

$2\text{NO}_2 \rightarrow 2\text{NO} + \text{O}_2$ ;  $2\text{NO} \rightarrow \text{N}_2 + \text{O}_2$ . Therefore, the final stage is the re-action of  $\text{C}_6\text{H}_{12}$  with  $\text{NO}$ . L. A. Matov assisted in the experiments. Ya. N. Nasirov is mentioned. There are 13 figures and 12 references: 6 Soviet-bloc and 6 non-Soviet-bloc.

Legend to Fig. 5: 1) n-butane.  
2) Cyclohexane. 3) p-xylene.  
4) Benzene.

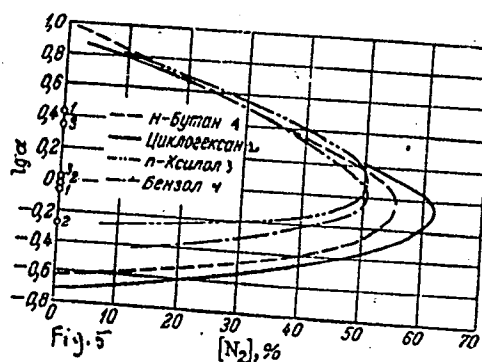


Fig. 5

Card. 4/6

Explosion hazard of mixtures ...

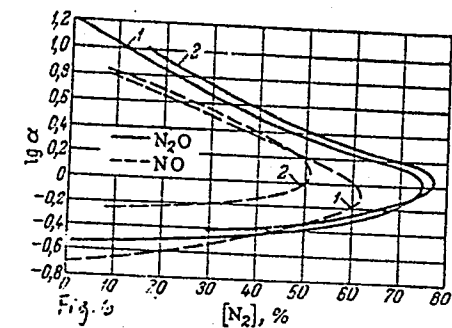


Fig. 6

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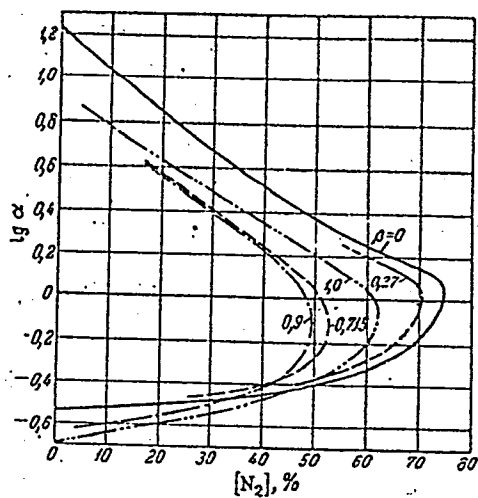


Fig. 9

Explosion hazard of mixtures ...

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B101/B203

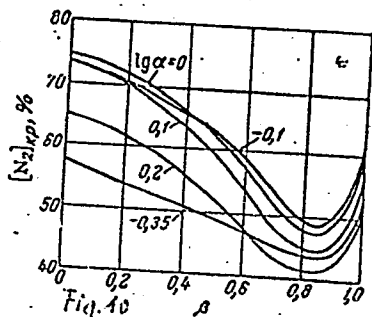


Fig. 10

Card. 6/6

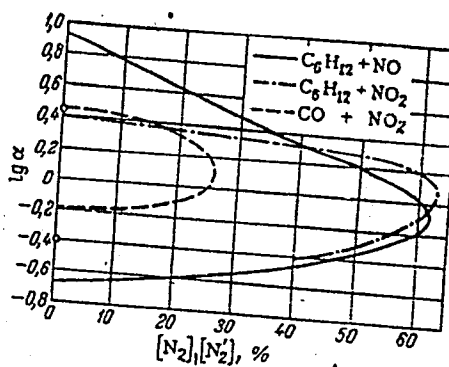


Fig. 13

BRANDT, B.B.; ROZLOVSKIY, A.I.; KHAYLOV, V.S.; Prinimal uchastiye: MATOV, L.A.

Explosiveness of mixtures of nitrogen oxides with combustible gases  
and vapors. Khim.prom. no.3:204-210 Mr '61. (MIRA 14:3)  
(Nitrogen oxide)

ROZLOVSKIY, A.I.; BRANDT, B.B.

Unified law governing the lower concentration limit of flame  
propagation. Dokl.AN SSSR 145 no.6:1331-1334 Ag '62.

(MIRA 15:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut  
azotnoy promyshlennosti i produktov organicheskogo sinteza.  
Predstavleno akademikom Ya.B.Zel'dovichem.

(Flame)

ROZLOVSKIY, A.I.; BRANDT, B.B.

Maximum explosion-proof concentration of oxygen in mixtures  
with fuel gases. Khim.prom. no.7:518-519 J1 '63. (MIRA 16:11)



VOLKOV, Abram Yefimovich; LAPIDUS, Aleksandr Semenovich; BEHANDT,  
B.B., red.

[Safety measures in the production of acetylene from  
natural gas] Tekhnika bezopasnosti v proizvodstve atse-  
tilena iz prirodnogo gaza. Moskva, Izd-vo "Khimiia,"  
1964. 148 p. (MIRA 17:5)

L 35016-65 EWT(m)/EPF(c)/EPR/ENP(j)/I/EWA(c) Pc-4/Pr-4/Ps-4 RPL EN/WH/  
ACCESSION NR: AP5010550 JW/WE/RM

UR/0064/65/000/004/0039/0044  
662.769:614.838

44  
B

AUTHORS: Brandt, B. B.; Rozlovskiy, A. I.; Strizhevskiy, I. I.; Zhaylov, V. S.

TITLE: Explosion hazard of mixtures of oxides of nitrogen with fuel gases and vapors

SOURCE: Khimicheskaya promyshlennost', no. 4, 1965, 39-44

TOPIC TAGS: explosion, nitrogen oxide, fuel, ignition limit, flame propagation

ABSTRACT: The influence of pressure on the concentration limits of ignition for mixtures of oxides of nitrogen with fuel gases and vapors was determined. The present paper is an extension of the work reported previously by B. B. Brandt, L. A. Matov, A. I. Rozlovskiy, and V. S. Khaylov (Khim. prom. No. 5, 412, 1960) and B. B. Brandt, A. I. Rozlovskiy, and V. S. Khaylov (Khim. prom. No. 4, 204, 1961). Three series of experiments were carried out. In the first series, concentration ignition limits for mixtures of nitric and nitrous oxide with cyclohexane at a constant pressure of 8 atm were determined. In the second, the dependence of the critical concentration of nitrogen on the fuel-gas pressure at the lower ignition limit for the mixture of n-butane, nitric and nitrous oxides

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1 55016-65

ACCESSION NR: AP5010550

and nitrogen was determined. In the third, the pressure dependence of the upper ignition limit for the mixtures of methane, nitric and nitrous oxides and nitrogen was determined. The experimental procedure was that of V. S. Medvedeva, A. I. Rozlovskiy, and I. S. Royzen (Khim. prom. No. 4, 330, 1960). The self-ignition temperature of  $\text{NO} + \text{NO}_2$  and  $\text{C}_6\text{H}_{12} + \text{N}_2$  was found to be 780-800C. In the presence of air the self-ignition temperature was found to be 500C. Flame propagation velocities for the first and second series of experiments were determined. The data of the second series could be represented as

$$U_n \sim e^{-A/T_b}$$

where  $U_n$  is the flame propagation velocity and  $T_b$  the thermodynamic flame temperature. The constant  $A = 350$  kcal/mole. The conditions for flame extinction for the system  $\text{C}_4\text{H}_{10} + \text{NO} + \text{N}_2\text{O} + \text{N}_2$  at  $\alpha = 1$ ,  $\beta = 0.715$ ,  $I = 40\%$ ,  $U_n = 10$  cm/sec

and 1 atm were determined. Raschig rings had a diameter of 14, 10, and 6 mm.  $\alpha$  is the coefficient of excess oxidizing agent,  $I$  the overall content of inert components, and  $\beta$  is the fraction of nitric oxide in the mixture. To eliminate explosion hazards for systems containing equilibrium amounts of liquid hydrocarbons, the vapor-gas mixture must be diluted at the entrance to the cooling chamber with nitrogen or waste gases, or the throttling and cooling processes must be adjusted such that the mixture remains nonexplosive. For systems containing

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L 55016-65

ACCESSION NR: AP5010550

nonequilibrium amounts of liquid hydrocarbons, explosion hazard may be eliminated by controlling the initial composition of the mixture, by increasing its water vapor content, and by controlling its temperature. Calculations based on the data of D. H. Derbyshire (Symp. Chem. Process Hazards, London, 1960, p. 37) showed that for the oxidation of xylene at an overall pressure of 20 atm and 50 atm the mixture remains nonexplosive for 200-180C and 250-230C respectively. Orig. art. has: 2 tables, 9 graphs, and 2 equations.

ASSOCIATION: none

SUBMITTED: 00

ENGL: 00

SUB CODE: WA, GC

NO REF SOV: 013

OTHER: 010

Inc 2/3  
Card 3/3

BRANDT, D.M.; ASOYAN, N.S., RIVINA, I.N., tekhnicheskiy redaktor.

[Netherlands] Niderlandy. Moskva, Gos. izd-vo geograficheskoi  
lit-ry, 1953. 115 p. (MLRA 7:8)  
(Netherlands--Description and travel)

D.M.  
BRANDT, ~~GEOGRAPHER~~

USSR/Geophysics - Floods

Aug 53

"Catastrophic Floods in Western Europe," D. M.  
Brandt, Geographer

Priroda, No 8, pp 122-128

Discusses circumstances and causes of disastrous  
storms which occasioned in Feb 1952 heavy damages  
in Western Europe, as a result of a combination of  
strong winds, rain and floods.

276165

1. BRANDT, E. Eng.
2. USSR (600)
4. Dwellings
7. Production-line construction during the winter. Mast. ugl. 2 No 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953. Unclassified.

BRANDT, E.

Experience in rapid building of miners' homes. Mast.ugl.3 no.3:17-18  
Mr '54. (MLRA 7:4)

1. Zamestitel' glavnogo inzhenera tresta Voroshilovgradpromshilstroy.  
(Building) (Coal miners)



BRANDT, E.

Academic conference on the history of the national economy of the  
Baltic republics. Vop.ekon. no.4:154-159 Ap '56. (MLRA 9:8)  
(Baltic States--Economic conditions)

BRANDT, Eduard

[Estonian S.S.R.; the development of its economy] Estonskaia  
SSR; razvitie ekonomiki. Tallinn, Estonskoe gos. izd-vo,  
1960. 148 p. (MIRA 15:3)  
(Estonia--Economic conditions)

BRANDT, E. (g.Leningrad)

A simple transistor panel. Radio no.5:51-52 My '62. (MIRA 15:5)  
(Transistors)

BRANDT, E.I.; MARGOLINA, O.I.

Peculiarities of physiological reactions during radiative heat loss. Opyt izuch.reg.fiziol.funk. no.3:103-118 '54.

(MIRA 8:12)

1. Fiziologicheskii otdel Dorsanepidstantsii Oktyabr'skoy zheleznoy dorogi i laboratoriya ekologicheskoy fiziologii Instituta fiziologii imeni I.P.Pavlova Akademii nauk SSSR.

(BODY TEMPERATURE)

BRANDT, E.I.; MORGOLINA, O.I.

Daily periodicity of physiological processes in the human body during a multiphase workday. Opyt izuch.reg.fiziol.funk. no.3: 190-203 '54. (MLRA 8:12)

1. Otdel promyshlennoy sanitarii i gigiyeny truda Dorsanepidstantsii Oktyabr'skoy zheleznoy dorogi i Laboratoriya ekologicheskoy fiziologii Instituta fiziologii imeni I.P.Pavlova Akademii nauk SSSR.

(BODY TEMPERATURE) (PULSE) (BLOOD PRESSURE)

BRANDT, E. I.

Effect of winter swimming on gas exchange and body temperature.  
Opyt izuch.reg.fiziol.funk. no.3:252-256 '54. (MIRA 8:12)  
(BODY TEMPERATURE) (RESPIRATION) (BATHS, COLD)

BRANDT, G.

5628. Brandt, G., Konyakhin, N. i Matveyev, D. Shkola peredovogo opyta. (Chkal. obl. na Vsesoyuz. s. - kh. vystavke). Chkalov, kn izd., 1954. 52 s. s. ill 21 sm 3.000 ekz 65k-  
[-55 - 836 7 p. 63 (064)(47) \*63 st (47.82).

SO: Knizhnaya, Letopis, Vol. 1, 1955

BRANDT, Georgiy Georgiyevich; KOLOMNIN, G.P., redaktor; SIDEL'NIKOVA, L.A.,  
redaktor; SHITS, V.P., tekhnicheskii redaktor;

[Production of bonded wood materials; based on data from  
foreign literature] Proizvodstvo drevesno-listovykh ma-  
terialov; po dannym inostranoi literatury. Moskva, Gos-  
lesbumizdat, 1956. 63 p. (MIRA 9:4)  
(Plywood)



TOKAREV, Fedor Vasil'yevich; BRANDT, Georgiy Ivanovich; LEONOVA, T.S.,  
red.; NAZAROVA, A.S., tekhn. red.

[On virgin lands of Orenburg Province] Na tselinnykh zemliakh Oren-  
burzh'ia. Moskva, Izd-vo "Znanie," 1961. 29 p. (Vsesoiuznoe ob-  
shchestvo po rasprostraneniu politicheskikh i nauchnykh znaniy.  
Ser.5. Sel'skoe khoziaistvo, no.16) (MIRA 14:9)

1. Vtoroy sekretar' Orenburgskogo oblastnogo komiteta Kommunistiche-  
skoy partii Sovetskogo Soyuza (for Tokarev). 2. Zaveduyushchiy  
sel'skokhozyaystvennym otделom redaktsii oblastnoy gazety "Yuzhnyy  
Ural" (for Brandt)  
(Orenburg Province--Agriculture)

BRANDT, I.L.

Prolonged symptomless presence of a foreign body in the nasal cavity.  
Zhur. ush., nos. i gorl. bol. 20 no.5:68 S-0 '60. (MIRA 14:6)  
(NOSE—FOREIGN BODIES)

Abstract X-ray investigation of structure of substances at pressures  
up to 30,000 atmospheres. L. F. Vereshchagina and I. V.  
Brandt. *Soviet Phys. "Doklady"* 1, 112-113 (1959) [English  
translation].--See C.A. 51, 3223g. B. M. R.

MT

X-ray investigation of structure of substances at pressures of up to 30,000 atmospheres. L. F. Vereshchagin and I. V. Brandt. Doklady Akad. Nauk S.S.S.R. 108, 423-4 (1958)

Phys

The investigation of discontinuities in the V-P curve at pressures exceeding 1000 atm., and a decision whether they are due to polymorphous transformations or to electron transfers inside the atoms, can be reached only by x-ray examn. of such substances at high pressures. An app. was constructed for Debye x-ray exposures at pressures up to 30,000 atm., and its use is described. X-ray pictures of Bi taken at 30,000 atm. pressure, i.e. above the pressure at which Bi is reduced in vol. by an 8.6% jump, shows the vol change to be caused by a crystal-structure change. At atm. pressure Bi is rhombohedral in structure; its structure at above 25,000 atm. is at present being deciphered.

W. M. Sternberg

Lab. FIZIKI SVERKHYSSOKIKH DAVLENIY,  
Acad. Sci. SSSR

BRANDT, Lukasz

Collaboration of the Voivodeship Contact Committee Central Technical Organization with the schools of the Opole Voivodeship.  
Przegl techn 85 no. 42:7 18 0 '64.

1. Deputy President of the Opole Voivodeship School Administration.

S.A.

Sect. A

Electric Conduction

537.312.62  
 3089. The question of the superconductivity of  
 binary alloys of bismuth. N. E. ALKHMAROV, N. B.  
 BRANITSKY AND T. I. KHUMBA. Zh. Eksperim. Fiz., 21,  
 (No. 8, 1951) In Russian.  
 The following become superconducting at temper-  
 atures indicated (in °K): BiLi (2-47), BiNa (2-23),  
 BiK (3-38), BiCa (2-68), BiZn (4-66), BiNi (4-23),  
 BiRh (2-66), BiRu (2-9), BiPd (3-4), BiPt (1-75);  
 the following are not superconducting down to the  
 temperatures indicated: BiLi (1-43), BiNa (1-99),  
 BiK (3-38), BiCa (1-68), BiZn (1-5), BiNi (1-38),  
 BiPt (1-47), BiRu (1-32). Some of these data have  
 been published previously. D. MURPHY

BRANDT, N. D., and ALEKSEYEVSKIY, N. E.,

"On the Displacement of Transition Temperature of Superconductors by Pressure," Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, 1952, Vol. 22, No. 2, pp 200-203, (Institute of Physical Problems Academy of Sciences USSR). Translation available at Battelle Memorial Institute; also at the Library of Congress Translation Center.

"The pressure dependence of  $T_c$  and  $Au_2Bi$ ,  $BiLi$  and  $Bi_2K$  was investigated by the ice-bomb technique the pressure being determined from the known value of  $DT/dp$  for  $In$ ,  $dT/dp$  in  $^{\circ}K \text{ dyne}^{-1} \text{ cm}^2$  for  $Bi_2K$  was  $5.1 \times 10^{-11}$ , for  $Au_2Bi \sim -3 \times 10^{-11}$  and for  $BiLi$  negative [no numerical data quoted, but from graph  $\sim -6 \times 10^{-11}$ ]. Since  $Au_2Bi$  and  $Bi_2K$  are both cubic with nearly identical lattices any possible effect of pressure through change of crystal angles cannot be relevant in causing the opposite signs of  $dT_c/dp$ ; it is suggested that the relevant factor may be change of electron concentration with pressure and that the positive sign occurs only with Bi-rich compounds."

BRANDT, N. B.

"Investigation of the Properties of Certain Binary Superconducting Compounds of Bismuth and Their Components." Cand Phys-Math Sci, Moscow State U, Moscow, 1954. (KL, No 2, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)  
SO: Sum. No. 556, 24 Jun 55



*BRANDT, N. S.*  
USSR/Physics - Galvanomagnetic effect

FD-1864

Card 1/1      Pub. 146-24/25

Author : Alekseyevskiy, N. Ye., and Brandt, N. B.

Title : Influence of all-sided compression upon the galvanomagnetic effects of bismuth and its alloys. I

Periodical : Zhur. eksp. i teor. fiz. 28, 379-383, March 1955

Abstract : The authors note that an investigation of the influence of all-sided compression upon electron concentration is of interest in connection with earlier considerations on the influence of the density of conduction electrons upon the character of the shift in the critical temperature of superconductors under elastic deformation. With this in mind they measured the Hall effect and variations in electrical resistance in a magnetic field in the case of bismuth and certain compounds of bismuth with other nonsuperconducting metals, and they investigated the temperature dependence of their electrical conductivity under compression and not. They present the results of these investigations. They noted the large number of similar studies by Ye. S. Borovik in 1950-1952. They remark that a considerable part of their work here was conducted at the Cryogenic Laboratory of the Moscow State University of Standards and Measuring Instruments, headed by Prof. P. G. Strelkov and associate A. S. Borovik-Romanov; they also thank T. I. Kostina, N. M. Kreynes, and V. V. Yevdokimova.

Institution: Institute of Physical Problems, Academy of Sciences

Submitted : June 14, 1954

Effects of small amounts of admixtures on bismuth gal-  
vanomagnetic properties N. E. Alekseyevskiy, N. B.

Brand, and I. I. Kostina, *Doklady Akad. Nauk* ~~1959~~

1959, No. 10. The effects of varying amounts of Se and

Te on the galvanomagnetic effects of Bi under pressure were

studied. Single crystals of Bi were used.

The samples were prepared by the Karp technique.

Small amounts of admixtures of Se and Te were

introduced into the Bi during the growth process.

The samples were then cut into thin plates.

The results of the measurements are presented in

Fig. 1. The curves show the dependence of the

resistance on the magnetic field. The effective

field  $H_{eff}$  and the ratio of the Hall field

to the magnetic field  $H_0$  are shown in Fig. 2.

The curves show the dependence of the

resistance on the magnetic field. The effective

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resistance on the magnetic field. The effective

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to the magnetic field  $H_0$  are shown in Fig. 2.

*RAW*

BRANDT, N. B., ALEKSEYEVSKIY, N. Ye., KOSTINA, T. I. (Moscow)

"Galvanomagnetic Properties of Bismut," a paper submitted at the  
International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31  
May 56.

BRANDT, N.B.

Welding of electric wires to specimens. Prib.1 tekhn.eksp.no.2:138-  
140 S-O '56. (MLRA 10:2)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. Lomonosova.  
(Electric instruments--Welding)



137-58-1-1558

*BRANDT, N. V.*

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 209 (USSR)

AUTHORS: Alekseyevskiy, N. Ye., Brandt, N. V.

TITLE: An Investigation of the Properties of the Compounds  $\text{Au}_2\text{Bi}$  and  $\text{Bi}_2\text{K}$  (Issledovaniye gal'vanomagnitnykh svoystv soyedineniy  $\text{Au}_2\text{Bi}$  i  $\text{Bi}_2\text{K}$ )

PERIODICAL: Vestn. Mosk. un-ta. Ser. matem., mekhan., astron., fiz., khimii, 1957, Nr 1, pp 39-43

ABSTRACT: An investigation has been made of the compounds  $\text{Au}_2\text{Bi}$  and  $\text{Bi}_2\text{K}$ , which exhibit similar crystal structures and periods, and have superconductivity and magnetic transformation temperatures of 1.75 and 3.58°K. Measurement of the magneto-resistance properties was made at 1.7°K and with magnetic fields of 30,000 Oe by the usual potentiometric method. The temperature was determined by the vapor pressure of liquid He in a Dewar flask. The starting materials were: Hilger Bi, 99.9996% pure; Kahlbaum K; Au 99.99% pure. The specimens of  $\text{Au}_2\text{Bi}$  were made in the form of thin platelets enclosed in quartz ampoules. After the ampoules were etched, the specimens were annealed for 5-7 days at 320°C. The specimens of  $\text{Bi}_2\text{K}$  were prepared

Card 1/2

137-58-1-1558

An Investigation of the Properties (cont.)

in special small baths, from which they were extracted in an inert gas atmosphere and then were covered with a layer of vacuum grease for preservation against oxidation. The quality of the specimens was monitored metallographically. It is shown that the nature of the relationship of the relative rise in electrical resistance to the magnetic field is virtually proportional to the square of the latter for both compounds. The anomalous curve of the change in the resistance of  $\text{Bi}_2\text{K}$  versus the intensity of the magnetic field causes advancement of the hypothesis that the de Haas-van Alphen effect may be observed in  $\text{Bi}_2\text{K}$ . An equation for evaluating the strengths of the current carriers has also been derived. The concentration of electrons in  $\text{Au}_2\text{Bi}$  and  $\text{Bi}_2\text{K}$  lies in the area between the concentrations of their components. This is in good agreement with the hypothesis on the relationship between the superconductivity and the optimal value of electron concentration.

V. R.

1. Gold compounds--Properties

Card 2/2

BRANDT, N. V.

137-58-5-10505

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 232 (USSR)

AUTHOR: Brandt, N. V.

TITLE: An Investigation of the Effect of Pressure on the Properties of Magnetic Resistance of Pb and Ga at Low Temperatures (Issledovaniye vliyaniya davleniya na gal'vanomagnitnyye svoystva Pb i Ga pri nizkikh temperaturakh)

PERIODICAL: Vestn. Mosk. un-ta, Ser. matem., mekhan., astron., fiz., khimii, 1957, Nr 3, pp 89-94

ABSTRACT: The influence of pressure on the properties of magnetic resistance of Pb and Ga at 4.2 and 1.6°K is conducted with 30-120 micron foil. A pressure of 170 atm, created by freezing water in a cylinder of constant volume, was determined by the shift in the critical temperature of a Sn sample within the cylinder. The temperature was determined by the vapor pressure on the surface of fluid in a Dewar flask. Measurement of the electrical conductivity (E) of the specimens was conducted with magnetic fields of up to 20,000 oersteds. Omnilateral compression at the temperature of liquid He induces reversible diminution in the E of Pb and Ga. The magnitude of the change in E increases as

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137-58-5-10505

An Investigation of the Effect (cont.)

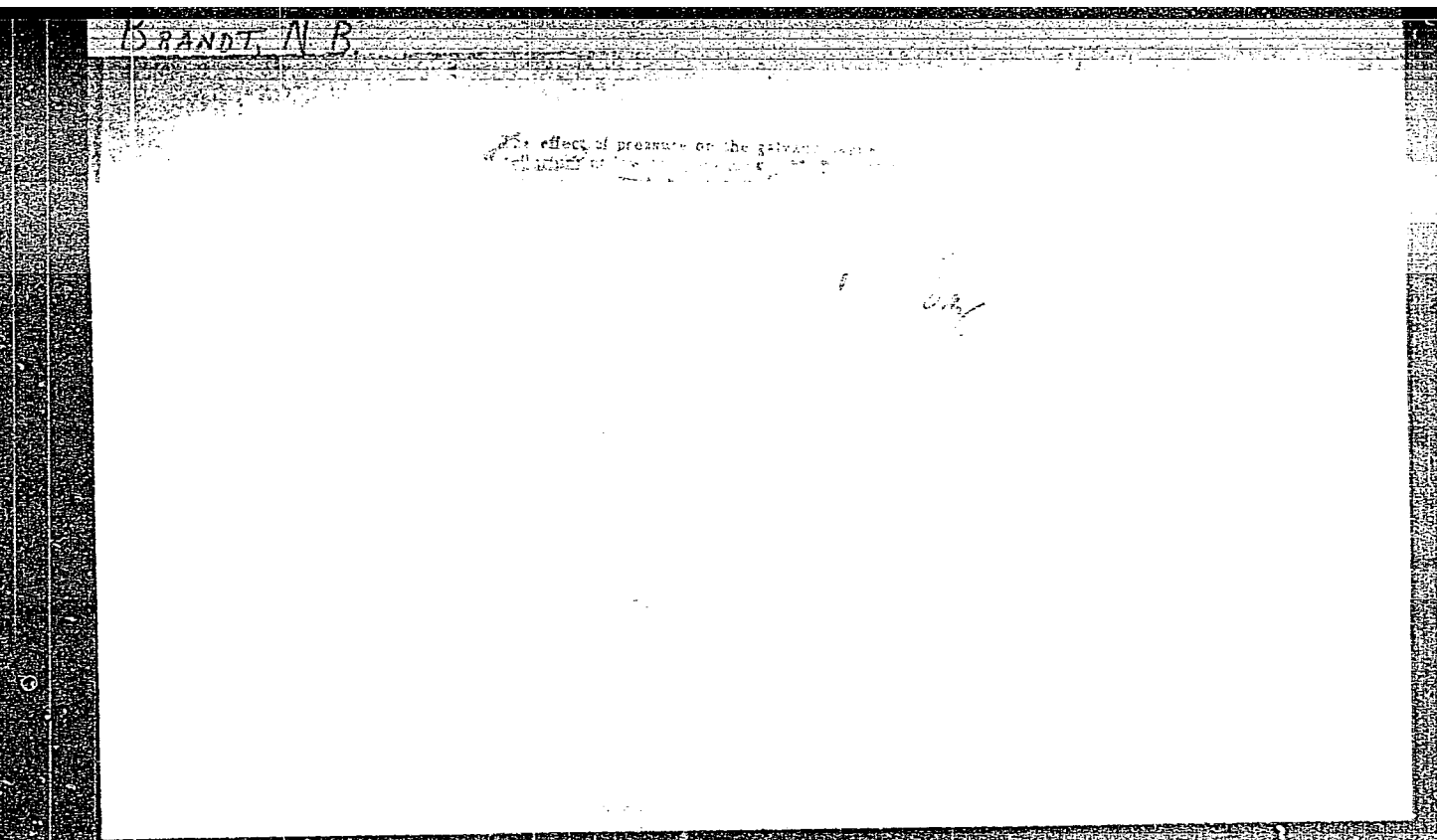
temperature drops. The Hall emf and the  $E$  of Ga specimens as a function of the magnetic field were also measured. The concentration of current carriers in Ga, calculated at 14°K for these data, is  $2.4 \cdot 10^{21} \text{cm}^{-3}$ . It is established that omnilateral compression of up to 1700 atm does not induce any noticeable change in the concentration of current carriers in the metals under investigation. Therefore the effect of pressure is evidenced chiefly in the level of mobility of the current carriers, which results in the change in  $E$ .

Ye. P.

1. Lead--Magnetic factors
2. Lead--Temperature effects
3. Gallium--Magnetic factors
4. Gallium--Temperature effects

Kafedra fiziki nizkikh temperatur Moskovskogo gosudarstvennogo universiteta.

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BRANDT, N.B.

48-6-2/23

SUBJECT: USSR/Physics of Magnetic Phenomena

AUTHOR: Alekseyevskiy, N.Ye., Brandt, N.B. and Kostina, T.I.

TITLE: Effect of Pressure on Galvanomagnetic Properties of Bismuth  
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957,  
Vol. 21, # 6, pp 790-795 (USSR)

ABSTRACT: The effect of an all-sided compression on the temperature-dependence of electric resistance and galvanomagnetic properties of bismuth was investigated.

Galvanomagnetic phenomena were studied on monocrystalline bismuth samples of various purity. Main admixtures in bismuth samples were Pb, Sn, Te and Se whose concentration varied from 0.03 to 0.0005 %, and by raising room temperature to that of helium, changed their electric resistance, and their resistance in a field of 19,000 oersteds at  $T = 4,2^{\circ} \text{K}$  changed by more than  $10^6$  times.

The following conclusions were drawn from the experiments performed:

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48-6-2/23

TITLE:

Effect of Pressure on Galvanomagnetic Properties of Bismuth  
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

The all-sided compression has a strong effect on the galvanomagnetic properties of bismuth. Small Te-admixtures (more than 0.005 %) wholly eliminate the pressure effect, whereas this effect is retained by Bi with Pb- and Sn-admixtures in considerably higher concentrations (0.02 %)

The Hall-coefficient and  $E_y/E_x$  ratio reverse the sign with the field in bismuth with Pb- and Sn-admixtures. The ratio  $E_y/E_x$  in the highly-intensive fields varies linearly with the field, and the value and sign of the angular coefficient depend on the nature and quantity of an admixture.

The temperature-dependence curve of the resistance of Bi containing Pb and Sn from 0.01 to 0.02 % has a peak at an all-sided compression, which disappears when the pressure is removed.

Sufficiently pure Bi-samples show oscillations of the dependences of  $r$  and  $E_y/E_x$  on  $H$ , which are maintained during the all-sided compression.

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48-6-2/23

TITLE: Effect of Pressure on Galvanomagnetic Properties of Bismuth  
(Vliyaniye davleniya na gal'vanomagnitnyye svoystva vismuta)

The article contains 8 graphs.

There are 12 references, 7 of which are Slavic (Russian).

ASSOCIATION: Institute of Physical Problems im. S. Vavilov

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress

Card 3/3

SOV/120-58-2-35/37

AUTHORS: Brandt, N. B. and Tomashchik, A. K.

TITLE: The Use of Alcohol-Water Solutions to Obtain Pressures at Low Temperatures (Ispol'zovaniye rastvorov spirt - voda dlya polucheniya davleniy pri nizkikh temperaturakh)

PERIODICAL: Pribury i Tekhnika Eksperimenta, 1958, Nr 2, pp 113-114 (USSR)

ABSTRACT: It is possible to increase considerably the uniformity of the pressure within a "bomb" and to obtain any required pressure (not exceeding 2000 atm) by the use of water solutions of ethyl alcohol instead of water. Fig.1a shows the dependence of the relative increase of the volume of such solutions on freezing on the concentration of alcohol. Curve 1 shows the resulting change in the volume relative to the initial volume of the solution at a temperature of 20°C. Curve 2 shows the change in the volume relative to the volume of the solution at the temperature of freezing. The freezing temperature of alcohol-water solutions is shown in Fig.1b. Fig.2 shows the dependence of the pressure on concentration

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SOV/120-58-2-35/37

The Use of Alcohol-Water Solutions to Obtain Pressures at Low Temperatures.

of alcohol at helium temperatures when the bomb is filled with solutions at 20°C. The pressure was measured by the shift in the critical temperature of tin (Ref.1). Results were obtained for a bomb made from unrefined beryllium bronze and having the following dimensions:- 12 x 6 mm, length of inner cavity 50 mm. Experiments on the solid phase of the alcohol-water solutions have shown that the coefficient of internal friction rapidly decreases as the concentration of alcohol increases. Thus, for example, the coefficient of internal friction at a temperature of -35°C decreases by a factor of several tens when the concentration of alcohol is increased from 5 to 10%. The use of water solutions of alcohol reduces the nonuniformity of pressure which occurs when specimens are compressed and gives very reproducible results. There are 2 figures, no tables and 5 Soviet references.

ASSOCIATION: Fizicheskiy fakul'tet MGU

(Department of Physics of the Moscow State University)

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24(3)

AUTHORS: Alekseyevskiy, N.Ye., Brandt, N.B. SOV/55-58-5-12/34  
and Kostina, T.I.

TITLE: Investigation of the "Quadratic" Hall-Effect for Bismuth, Tin and Aluminum for low Temperatures (Issledovaniye "kvadratichnogo" effekta Kholla u vismuta, olova i alyuminiya pri nizkikh temperaturakh)

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1958, Nr 5, pp 73 - 78 (USSR)

ABSTRACT: The quadratic Hall-effect for Ge measured by Goldberg [Ref 1] was measured by the authors for Al, Sn and Bi in the temperature interval from 293° to 4.2° K in different magnetic fields. In order to determine the influence of this effect on galvanomagnetic metal properties for strong effective magnetic fields

$$\left( H \frac{r_{o, 293^{\circ} K}}{r_{o, T}} \right)$$

simultaneously the electronic resistance of the same test pieces was measured in the transverse--and longitudinal field. The test-pieces had been produced according to the method of

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Investigation of the "Quadratic" Hall-Effect for  
Bismuth, Tin and Aluminum for low Temperatures

SOV/55-58-5-12/34

P.L. Kapitsa. The effect was observed on for all test pieces and increased with decreasing temperature and cleanliness of the test piece. The impurities of Te have particularly strong influence on the galvanomagnetic properties of Bi; Sn and Sb have a weaker effect. Several further statements are given. There are 6 figures, 1 table, and 9 references, 5 of which are Soviet, 3 American, and 1 English.

ASSOCIATION: Kafedra fiziki nizkikh temperatur (Chair of Physics of Low Temperatures)

SUBMITTED: April 5, 1958

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SOV/56-34-5-51/61

AUTHORS: Alekseyevskiy, N. Ye.; Brandt, N. B.; Kostina, T. I.

TITLE: On the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures (Ob anomal'nykh gal'vanomagnitnykh svoystvakh metallov pri nizkikh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1339-1341 (USSR)

ABSTRACT: Investigating the galvanomagnetic properties of bismuth in transverse and longitudinal magnetic fields, the authors observed an anomalous change in the potential difference similar to that observed by other authors. According to the results obtained by these authors the difference of the potentials  $V_x$  measured on the potential electrodes after the usual increase in weak magnetic fields passed through a minimum, and then decreased to zero. In some cases also the sign changed. The authors made additional experiments in order to investigate the influence of the form and of the manner of connecting the electrodes on the character of the variations of  $V_x$  in a magnetic field. It is possible to explain the anomalies which were observed previously by other authors

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SOV/56-34-5-51/61

## On the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures

by the influence of quadratic effects, in particular by a "quadratic Hall effect". This effect consists in the following: In the specimens placed in a magnetic field there is a transverse difference of the potentials  $V_y$  in the plane which is determined by the directions of the current and of the magnetic field. The difference of the potentials  $V_y$  is a quadratic function of the magnetic field strength and in isotropic specimens it has its maximum values if the angle between current and field is equal to  $45^\circ$ . If the variation of the resistance in the magnetic field is small (for instance for measurements in a longitudinal field) only a very small component  $V_y$  (directed parallel to the specimen) is sufficient to distort in a qualitative manner the curve of the real variation of the resistance in the magnetic field. An especially strong distortion of the discussed results is observed, if the area of the current contacts is small with respect to the cross-section of the specimen and if the potential electrodes are placed close to the ends of the specimen. Increasing the relation (length of the specimens/diameter of the specimens) did not diminish the anomalous effects, when the position of the potential electrodes was not

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On the Anomalous Galvanomagnetic Properties of Metals at Low Temperatures

changed. It is advantageous to execute the measurement on specimens with electrodes which have the same cross-section as have the specimens. There are 1 figure and 9 references, 3 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR  
(Institute for Problems on Physics, USSR) Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: February 5, 1959

1. Metals--Magnetic properties
2. Metals--Temperature factors

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24(3)

SOV/56-35-5-4/56

AUTHORS: Brandt, N. B., Venttsel', V. A.

TITLE: The Influence Exercised by Compression From All Sides on the Oscillation of Magnetic Susceptibility in Bismuth at Low Temperatures (Vliyaniye vsestoronnego szhatiya na ostsillyatsiyu magnitnoy vospriimchivosti vismuta pri nizkikh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 5, pp 1083-1087 (USSR)

ABSTRACT: Brandt and others (Refs 1-3) already investigated the influence exercised by pressure on the galvanomagnetic properties of bismuth and discussed the possibility of determining the influence exercised by pressure on the quantum oscillations of magnetic susceptibility and on the de Haas-van Alphen (de Gaaz - van Al'fen) effect (Refs 1-6). The experiments described by the present paper were carried out in a bomb (Fig 1) according to the method developed by Lazarev and Kan (Ref 7) on monocrystalline very pure Bi-samples. Measurements were carried out at 3 different main orientations of samples. Figure 2 shows the course of 3 more or less damped susceptibility oscillations at 4.2 and 1.6°K and at a pressure of about 1000 atm. The diagrams are made in the coordinates  $C/H^2$  and  $1/H$ .

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$C/H^2 = \Delta\chi \sin\psi \cos\psi$ , where  $C$  denotes the moment of the force,  $H$  the magnetic field in Oe,  $\Delta\chi$  the anisotropy of magnetic susceptibility, and  $\psi$  the angle between the main crystal axis and  $H$ . The oscillations were recorded at  $\psi = 76, 170$  and  $175^\circ$ . A further diagram (Fig 3) shows the results of oscillation frequency measurements for various  $\psi$ -values at about 1000 atm in the range  $70^\circ < \psi < 190^\circ$ . The magnetic field strengths used for measurement attained values of up to 13 kOe. The dependence  $E_F/\beta$  (cf. the formula derived by D. D. Landau in reference 9) on  $\psi$  shows a distinct maximum at  $\psi = 180^\circ$  whereas the two curves (a, b) calculated according to formulae (Ref 9) have far higher maxima (Ref 3) at about  $170$  and  $190^\circ$  ( $E_F$  = Fermi boundary energy). Figure 4 shows comparative measurements for the dependence  $\Delta S_m/S_m$  on  $\psi$ . As  $E_F/\beta$  is proportional to the extremal area of the cross section  $S_m$  of the Fermi surface (1 H. cf. reference 10), also figure 4 shows that the deformation of the Fermi surface in Bi under pressure is not homogeneous (Ref 4). The phase variation of the  $\Delta\chi$ -oscillations at  $\sim 1000$  atm does not exceed

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10% and the variation of the anisotropy of the constant part of the magnetic susceptibility  $\Delta\chi_0$  does not exceed  $\pm 2\%$  ( $\Delta\chi_0 = \chi_{\perp} - \chi_{\parallel}$ ). Finally, the anisotropy of the effective mass tensor was investigated for the de Haas-van Alphen-effect, and also the Dingle factor and electron concentration were investigated. The results obtained by measuring various quantities at  $p = 0$  and  $p = 1000$  atm are clearly shown by a table. In conclusion, the authors thank N. Ye. Alekseyevskiy and A. A. Abrikosov for their interest and advice, and they also thank sr. mechanic S. G. Obruchnikov and Yu. V. Yerofeyev for their assistance. There are 4 figures, 1 table, and 13 references, 10 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: January 24, 1958 (initially) and August 5, 1958 (after revision)

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SOV/120-59-4-45/50

AUTHOR: Brandt, N. B.

TITLE: A Simple Spring Balance for Measuring Magnetic Susceptibility

PERIODICAL: Pribery i tekhnika eksperimenta, 1959, Nr 4, pp 153-155  
(USSR)

ABSTRACT: The author describes a simple balance for measuring magnetic susceptibility in a wide range of temperatures. This balance was used successfully in studies of magnetic susceptibility of bismuth. The operation of the balance is based on elastic torsional deformation (rotation of the lower end of the spring when the upper end is fixed) which occurs in a cylindrical spiral spring with a rectangular cross-section of the wire on variation of the load applied along the longitudinal axis of the spring. Such a spring may be used in measurement of the absolute values of magnetic susceptibility by Gouy or Faraday methods. The balance is shown in Fig 1. The force acting on a sample in a non-uniform magnetic field is transmitted by a glass or quartz rod with a damper 2 and a mirror 3 to the spring 4

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A Simple Spring Balance for Measuring Magnetic Susceptibility

whose lower end is rotated thereby. Rotation of the moving system is observed through a window 5, and the displacement of the mirror is used as the measure of the rotation. The moving system is fixed to a stopper 6 inside the glass tube 7. The tube 7 passes through a metal stopper 8 into a Dewar vessel or a cryostat. The lower end of the tube, below a stopper 9 may be removed in order to make the positioning of samples easier. A side tube with a tap 10 is used to evacuate the instrument and to fill it with gaseous helium at low pressure (15 to 20 mm Hg). Helium is used to improve thermal contact of the sample with the surrounding medium, say, in a cryostat. Two stoppers (11 and 12) placed eccentrically and at right angles to the main tube are used to stop the motion of the moving part of the instrument and to determine the sensitivity of the balance. On rotation of the stopper 1 a fork of an arresting device 13 raises the arch of the damper 2 (the damper moves in a bath of oil). This effectively locks the moving system of the instrument. To determine the balance sensitivity a rider 14 of known weight is placed on the damper arch. The most convenient spring diameter is 2 mm. In this case maximum sensitivity is achieved at minimum

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## A Simple Spring Balance for Measuring Magnetic Susceptibility

extension of the spring under load. The ratio of the magnitude of rotation  $\Delta\varphi$  of the lower end of the spring to its extension ( $\Delta l$ ) can be made very large, so that the position of the sample in the magnetic field is practically unaltered. When springs made of a metal tape of thickness less than 10-15  $\mu$  are used, the oil damper is replaced by a magnetic one. Rotation of the suspended system may occur also due to anisotropy of the samples. To allow for this anisotropy the sample is first placed in a uniform magnetic field and the direction of the field is found such that the moments of forces acting on the anisotropic sample are equal to zero. Then the sample is placed in a non-uniform magnetic field which is given the direction established earlier for the uniform field. The sensitivity of the balance described here is considerably greater than the sensitivity of the Sucksmith system (Ref 5). The balance is simpler in use and adjustment and has a lower noise level due to the

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A Simple Spring Balance for Measuring Magnetic Susceptibility

use of efficient damping. The stability of springs prepared from rolled phosphor bronze strip is sufficiently high. The stability can be improved by the use of beryllium bronze or flat quartz threads. Acknowledgments are made to A. I. Shal'nikov and P. L. Kapitsa for their advice and to M. V. Volkov for his help in testing the balance. There are 1 figure, 1 table and 6 references, 4 of which are Soviet, 1 English, and 1 Soviet translated from English.

ASSOCIATION: Fizicheskiy fakul'tet MGU (Physics Department Moscow State University)

SUBMITTED: July 11, 1958.

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24(3)

SOV/56-37-2-9/56

AUTHORS: Brandt, N. B., Ryabenko, G. A.

TITLE: Investigation of the Influence of a Unilateral Compression Upon the Quantum Oscillation of the Magnetic Susceptibility of Bismuth

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 2(8), pp 389-391 (USSR)

ABSTRACT: An investigation of universal compression upon the oscillations of magnetic susceptibility in bismuth has (in contrast to zinc) caused considerable anisotropic deformation of the Fermi surface under pressure. According to the theory developed by Kosevich, this anisotropy is connected with a variation of the law of dispersion, which is dealt with more in detail in the introduction. Next, the device used by the authors for the purpose of investigating anisotropy in single crystals in the case of unilateral compression is described. It is schematically shown by figure 1. The samples were investigated at various pressures (0, 35, 70, 200, and 340 kg/cm<sup>2</sup> along the trigonal crystal axis) and at temperatures between 1.6 and 4.2°K. At every pressure

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